

Title page

Changes over time in the management of long-term conditions in primary health-care for adults with intellectual disabilities, and the health-care inequalities gap

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Abstract

Background

Quality of primary health-care impacts on health outcomes. This study aimed to quantify trends in good practice and the health-care inequalities gap.

Method

Indicators of best practice management of long-term conditions and health promotion was extracted from primary health-care records on 721 adults with intellectual disabilities in 2007-2010, and 3,638 in 2014. They were compared over time, and with the general population in 2014, using Fisher's Exact test and ordinal regression.

Results

Management improved for adults with intellectual disabilities over time (OR=5.32; CI=2.69-10.55), but not for the general population (OR=0.74; CI=0.34-1.64). However, it remained poorer, but to a lesser extent, compared with the general population (OR=0.38; CI=0.20-0.73 in 2014, and OR=0.05; CI=0.02-0.12 in 2007-2010). In 2014, health-care was comparable to the general population on 49/78 (62.8%) indicators.

Conclusions

The extent of the health-care inequality gap reduced over this period, but remaining inequalities highlight that further action is still necessary.

Introduction

Compared to the general population, people with intellectual disabilities have been reported to experience significant health inequalities (Hughes-McCormack et al., 2017a; Hughes-McCormack et al., 2017b; Ouellette-Kuntz., 2005), poor access to health-care (Robertson et al, 2015; Lunsy et al., 2005), and premature mortality; a notable proportion of which may have been amenable to good quality health-care (O’Leary et al., 2017; Cooper et al., 2020; Brameld et al, 2018; Stankiewicz et al, 2016; Glover et al., 2016; Troller et al., 2017; Hosking et al., 2017; Heslop et al., 2014; Tyrer et al., 2009). Such findings have been reported across several countries, including UK, North America, and Australia. Despite this, there are significant evidence gaps related to their health and health-care utilisation (Robertson et al., 2015).

Primary health-care provision is essential to reduce inequalities experienced by people with intellectual disabilities, through effectively managing long-term conditions, in keeping with best practice. However, primary health-care professionals experience challenges in the care of adults with intellectual disabilities, partly due to lack of experience and training with this population (Williamson et al., 2004; Lennox et al., 2000; Fredheim et al., 2013; Melville et al., 2005; Powrie et al., 2003). This has contributed to unequal primary health-care provision for people with intellectual disabilities compared with the general population, which has previously been quantified (Cooper et al., 2017). A study of 721 adults with intellectual disabilities showed that during 2007-2010, they received poorer management of their long-term conditions

on 38/57 (66.7%) of indicators of good quality care, when compared with the general population (Cooper et al., 2017).

Whilst there are important geographic and population sub-group exceptions, health-care improves over time, due to more effective treatments, improvements in service organisation and delivery (World Health Organisation, 2000), greater awareness/learning amongst clinicians, and higher expectations of service-users. We do not know if this is also true for people with intellectual disabilities, or indeed if any improvements occur to a greater or lesser extent than for the general population i.e. whether the health-care inequality gap is static, widening, or reducing. To our knowledge, developments in the quality of primary health-care provided to people with intellectual disabilities have not been quantified over time, or on a large scale, nor with comparison to any changes in the health-care of the general population.

The aim of this study was to quantify good practice and changes in the quality of management of long-term conditions within primary health care for adults with intellectual disabilities compared with the general population, using indicators which are considered to be evidence-based best practice. Specifically, we investigated: (1) whether there exists a health-care inequality gap between adults with intellectual disabilities compared with the general population in 2014; (2) whether the management of long-term conditions for adults with intellectual disabilities has improved between 2007 and 2014; and (3) whether the observed health-care inequality gap between adults with

intellectual disabilities and the general population in 2007 has been reduced in 2014.

Methods

Ethical Approval and Consent

Ethical approval was obtained from the Multicentre Research Ethics Committee – Scotland A (Reference: 06/MRE00/31), and approval was also given by the Local Medical Committee, each individual participating general practice (as in the UK, they are the guardians of their patients' health records), the NHS Greater Glasgow and Clyde (NHS GGC) Keep Well/Enhanced Services Data Group (the Local Privacy Approval Committee at the time), and the West of Scotland Safe Haven. Between 2007-2010, each individual with intellectual disabilities was invited to consent to participate. Where participants lacked decision-making capacity to consent, this was sought from their welfare guardian/attorney or nearest relative, in keeping with Scottish law. In 2014, general practice patient data was extracted electronically with the above approvals in place.

Participants and Setting

During 2000-2002, in NHS GGC, the largest Health Board in Scotland, the local intellectual disabilities health service worked with each general practice to establish an intellectual disabilities register, from users of the health services, local authority provided services, and local authority funding for intellectual disabilities services, day centre users, and general practice records. General practitioners were financially incentivised to identify their population with

intellectual disabilities, and intellectual disabilities nurses checked that each identified person actually had intellectual disabilities. The register was then updated annually, jointly via the general practices and the intellectual disabilities service. It was used as the source to identify the adults with intellectual disabilities at both time points in this study (see further details below); prevalence of intellectual disabilities on the register did not change over this period.

Time point one (2007-2010): During 2007-2010, we recruited and collected data on a population-based cohort of adults with intellectual disabilities aged 18 years and over, *registered within a representative sub-sector of general practices in NHS GGC*. Consent to participate was gained for 727 of the 836 adults approached (87.0%).

Time point two (2014): Subsequently, in 2014, 191 of the 263 (73%) general practices *across the whole of NHS GGC* consented, and data was extracted for all participants with intellectual disabilities aged 18 years and over who were registered within these practices. All data was anonymised before it was made available to the research team for analysis within the NHS GGC Safe Haven.

As we did not have ethical approval to extract general population data from the general practice records, comparison data was drawn from publicly available aggregated general population data for all general practice patients aged 18 and over within NHS GGC in 2007 (n=764,762), and in 2014 (n=799,893) (Scottish Government, 2014).

Process and measures

The Quality and Outcomes Framework was part of the Scottish contract between general practitioners and the government health department, and included payment for performance on specific indicators of management of long-term conditions, and health promotion, considered to be evidence-based best practice. General practices had to report, annually, their number of patients with each of the specified long-term conditions, and the proportion whose care met the defined quality indicators. We collected data on each of these indicators. In 2007-2010, the adults with intellectual disabilities consented for manual extraction of their health data on each indicator from their primary health-care records. In 2014, the same data was electronically extracted from primary health-care records in a bespoke data extraction specifically designed for this study. Some of the indicators were changed/adapted annually by the Government, in keeping with development of clinical guidelines. Findings for 13 conditions, and health promoting activities, were identified in 2007-2010 (57 indicators), and for 19 conditions and health promoting activities in 2014 (78 indicators). For the analysis of performance of indicators across time, for consistency of comparison, the 2007/08 Quality and Outcome Framework best-practice quality indicators were used. Comparable data across time was available for 12 conditions plus health promoting activities, and a subset of 40 indicators.

Age, gender, and extent of neighbourhood deprivation, using the Scottish Index of Multiple Deprivation (Scottish Government, 2016) was also recorded.

Level of intellectual disabilities was measured by the Vineland Scale during 2007-2010.

Statistical Analyses

Patient characteristics for those with intellectual disabilities have been described. Categorical variables have been summarised with the number and percentage in each category. Age has been summarised as a continuous variable using the mean and the minimum and maximum (range). Comparisons between the 2007-2010 cohort with the 2014 cohort were made using t-tests and χ^2 tests. Summary data was available for the achievement of best practice indicators at both time points for the general population, so these data are summarised with the number and percentage achieving best practice. P-values from Fisher's Exact tests have been presented for the comparisons of the summary data, specifically the 2014 indicators a) between adults with intellectual disabilities and the general population, and b) between adults with intellectual disabilities over time; 2007-2010 and 2014.

To investigate the reduction in healthcare inequalities, the number and percentage of indicators at 2007-2010 and 2014 that met good practice levels have been presented for adults with intellectual disabilities and the general population. P-values from Fisher's Exact tests have been presented for the comparison of the proportion of indicators met (0-25%, 25.1-50%, 50.1-75%, 75.1-100%) a) between groups at each time point and b) separately for each group across time. Ordinal regression was used to explore whether there were changes over time, for any observed differences between the proportion of

indicators met for the intellectual disabilities' population compared to the general population. The regression model included group and time point as main effects as well as the interaction between group and time. Odds ratios (ORs) and 95% confidence intervals (CIs) have been presented for the comparisons with a p-value for the interaction term.

Data were analysed using the statistical packages SAS version 9.3 and R version 3.3.2. All analyses are exploratory analyses that do not focus on a single primary endpoint and therefore these are all nominally assessed at the 5% significance level with two-sided tests.

Results

Characteristics of Participants

Of the 727 consented participants in 2007-2010, four were excluded as their practices were not participating in the Quality and Outcome Framework, and two were excluded as they were actually under 18 years old, leaving 721 included in the analyses. In 2014, 3,638 participants were included. As expected, there were more men than women: in 2007-2010, of the 721 participants, 398 (55.2%) were men and 323 (44.8%) women, compared with 2,109 (58.0%) men and 1,529 (42.0%) women in 2014 ($\chi^2=1.78$, $p=0.18$). In 2007-2010, mean age was 44.3 years (18-92 years) compared with 45.9 years (18-92 years) in 2014 ($t=-2.60$; $p=0.01$). 189 (26.2%) in 2007-2010 and 1,326 (36.4%) in 2014 lived in the most deprived neighbourhoods, and only 15 (2.1%) in 2007-2010 and 114 (3.1%) in 2014 lived in the most affluent neighbourhoods (SIMD10) ($\chi^2=44.40$, $p<0.001$). In 2007-2010, 255 (35.4%)

had mild, 194 (26.9%) had moderate, 128 (17.8%) had severe, and 143 (19.9%) had profound intellectual disabilities. Level of intellectual disabilities was not available from the bespoke electronic data extraction in 2014.

The health-care inequality gap between adults with intellectual disabilities compared with the general population in 2014

Table 1 reports the achievements on Quality and Outcome Framework indicators in 2014, for the 3,638 population with intellectual disabilities versus 799,893 general population. On n=49/78 (62.8%) indicators there was no significant difference between people with intellectual disabilities and the general population. Nominally significant differences were observed between people with and without intellectual disabilities on n=29/78 (37.2%) of the clinical indicators, spread across 10 conditions (atrial fibrillation, asthma, coronary heart disease, chronic obstructive pulmonary disease (COPD), diabetes, depression, epilepsy, psychosis, rheumatoid arthritis, stroke), and all of the indicators relating to health promotion. For 9 of these conditions, the poorer management was for the intellectual disabilities population. Unlike other conditions, for people with mental health conditions the percentage for whom the indicators were met was higher for the population with intellectual disabilities than the general population across all the indicators, with the exception of cervical screening. For women with intellectual disabilities, the percentage meeting the cervical screening indicator was higher for those with mental health conditions than it was for all women with intellectual disabilities, whereas in the general population it was lower for those with mental health conditions than it was for all women in the general population.

All health promotion indicators were nominally significantly different between the two populations. On most indicators, people with intellectual disabilities received poorer care than the general population. However, more people with intellectual disabilities aged 40 and over had a record of blood pressure in the preceding 5 years, and there was more recording of smoking status in the preceding 24 months.

- Insert table 1 about here -

Improvement in management of long-term conditions and health promotion for adults with intellectual disabilities between 2007 and 2014

Table 2 shows the rates of achievement on the Quality and Outcome Framework indicators over time for the adults with intellectual disabilities in 2007-2010 (n=721), and in 2014 (n=3,638). Twelve conditions plus two health promotion actions, and 40 clinical indicators in total could be compared between the two time points. Improvements were observed in 2014 compared with 2007-2010 on 19 of the 40 (47.5%) clinical indicators, across 8 of the 12 (66.7%) conditions (asthma, coronary heart disease, diabetes, epilepsy, heart failure, hypertension, psychosis, stroke), and health promotion activities. No indicator was statistically significantly worse in 2014.

- Insert table 2 about here -

Reduction in the health-care inequalities gap between adults with intellectual disabilities and the general population from 2007 to 2014

Table 3 shows the extent of changes in the health-care inequalities between adults with intellectual disabilities and the general population over time. It shows the proportion of quality indicators met for adults with qualifying long-term conditions and for health promotion in each group and between the time points. In adults with intellectual disabilities there is a significant difference between the time points indicating that there has been an improvement in the proportion of indicators met over time ($p < 0.001$), whereas there is no difference over time for the general population ($p = 0.718$).

The inequalities between adults with intellectual disabilities and the general population was greatest in 2007-2010 ($p < 0.001$); by 2014, the inequality health-care gap between the two populations had narrowed ($p = 0.008$). Among the population with intellectual disabilities in 2007-2010, 26/56 (46.4%) had less than 50% achievement of the quality indicators. In comparison, among the general population in 2007-2010, only 1 (1.8%) had less than 50% achievement. In 2014, the general population remained fairly consistent, with only 1 of the 78 indicators (1.3%) with less than 50% achievement. However, among the population with intellectual disabilities in 2014, only 10 (12.8%) of the indicators had less than 50% achievement; a notable improvement from the proportion found in 2007-2010 (46.4%). So although there appeared to be a significant health-care inequality gap between the two populations in 2014, the extent of the gap had been reduced from 2007-2010.

- Insert table 3 about here -

The results from the ordinal regression analysis show that there is a significant interaction between group (intellectual disabilities or general population) and time ($p < 0.001$), re-iterating the observed suggested reduction in health-care inequalities from Fisher's exact tests above. Hence two further ordinal regressions were conducted, one each for the group with intellectual disabilities, and for the general population group (table 4). The comparisons within each group over time show that the higher proportion of indicators met for adults with intellectual disabilities are 5.32 times more likely in 2014 than in 2007-2010, whereas for the general population, there is no significant statistical difference over time. Then, looking at the group effect within each time point, adults with intellectual disabilities are less likely to have a higher proportion of indicators met than the general population at both time points; however in 2014, although still less than for the general population, the proportion met is larger compared to the general population than in 2007-2010 (2007-2010: OR 0.05; 2014: OR 0.38) (table 4). Healthcare for the adults with intellectual disabilities, though poorer than that for the general population, had improved to a greater extent over time than it had for the general population.

- Insert table 4 about here -

Discussion

Principal findings and interpretation

Management of long-term conditions and health promotion improved for people with intellectual disabilities over time, and, of considerable importance, the health-care inequality gap whilst still present was shown to have reduced. We believe this is the first study to have demonstrated improvements in health-care for adults with intellectual disabilities relative to the general population over time. This is important, as good health-care is one of the pathways to better health, and poor health, multi-morbidity, and premature death are substantial problems for people with intellectual disabilities (Cooper et al., 2014; Kinnear et al., 2018; Glover et al., 2016). This finding is additionally important, as despite public health services having worked for decades to reduce health and health-care inequalities in minority populations (Marmot, 2010), there have been few successful examples such as this (Mackenbach, 2010, 2011; National Audit Office, 2010).

In the area the study was being conducted in, several initiatives were underway in the intervening period to support primary health-care services in delivery of health-care, including a programme of health checks for adults with intellectual disabilities, and dedicated support from the intellectual disabilities health service to primary care. It is possible that these initiatives contributed to the results we report, and if so, demonstrate that poor health-care is not inevitable for people with intellectual disabilities and improvements can be made.

Several of the conditions we studied occur more commonly in adults with intellectual disabilities than they do in the general population, hence poorer

health-care of these conditions compounds problems. An exception was psychosis, which is also more common in people with intellectual disabilities (Cooper et al., 2007). Unlike other conditions, the population with intellectual disabilities and psychosis received better care on the psychosis indicators than the general population with these conditions. The reverse was the case for depression. This is possibly explained by the provision in Scotland of community intellectual disabilities teams, which include intellectual disabilities psychiatrists and intellectual disabilities nurses. It would be unusual for people with intellectual disabilities and psychosis not to be under the care of these teams in addition to primary health-care services. This is not currently the case for people with intellectual disabilities and depression unless they have severe depression, as many with milder depression are managed solely in primary health-care services, rather than receiving additional support from community intellectual disabilities teams.

Health promotion was particularly poor for the population with intellectual disabilities compared with the general population, although notably, there was some improvement between 2007-2010 and 2014.

Several important health-care areas showed improvements both over time and relative to the general population e.g. diabetes management and asthma management, whilst in other areas there were improvements over time e.g. in recording smoking status and referral to smoking cessation programmes but with inequalities still existing relative to the general population. It would be of interest to repeat these comparisons over further time, although the Quality

and Outcome Framework was withdrawn from Scotland on 31 March 2016, and so general population data is no longer publicly available.

Comparison with other studies

Several studies have reported barriers in accessing health-care and health promotion for people with intellectual disabilities, and poor health-care, but we are not aware of any previous studies quantifying relative changes over time, with which we can draw comparisons.

Strengths and limitations

This was a large population-based study that used hard indicators to measure health-care at two points in time, comparing care for the population with intellectual disabilities with that for the general population. The earlier cohort was a subset of the whole Health Board area participants in 2014, but in 2014 the average age was 1.6 years older than in 2007-2010 (45.9 years compared with 44.3 years), and a higher proportion lived in areas of most neighbourhood deprivation (36.4% compared with 26.2%). We do not know if these were changes that occurred in the Health Board area over the (average) 5.5 years of the study, or if the cohort in 2007-2014 differed on these characteristics from the whole Health Board population. In 2014, the study included all of NHS GGC, whereas at the first time point it included only part of this area. This study's findings would be generalisable to other affluent countries with similar services and context to NHS GGC, including well-developed primary care services and where initiatives are made to improve the health-care of adults with intellectual disabilities, but further research would

be needed to demonstrate whether or not that is so. The main limitation is that during 2007-2010, the data on the people with intellectual disabilities was manually extracted from primary care health records so it is conceivable that a small amount of human error might have occurred given the volume of data extracted, whereas in 2014 it was electronically extracted. The general population data was electronically extracted at both time points. Additionally, the general population comparison data also includes people with intellectual disabilities, as it reports whole-population data. However, this relates to only 0.5% of the whole population, so the impact is small. A further limitation is that the long-term conditions included in the Quality and Outcomes Framework may not include all those that are most relevant to people with intellectual disabilities, for example, obesity. There may also be confounding factors that we were not aware of and have not taken account of.

Implications

Long-term health conditions are not being managed as well in primary health-care services for patients with intellectual disabilities compared to those of the general population, but the health-care inequality gap reduced between 2007-2010 and 2014. We cannot infer whether or not this has continued since 2014. The remaining inequalities reported in 2014 highlight that greater awareness and further action is still necessary and complacency a non-option.

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Table 1: Achievement on Quality and Outcome Framework indicators in 2014, for the 3,638 intellectual disabilities group versus 799,893 general population group

Individual Indicators	Intellectual disabilities N=3,638	General population N=799,893	P value
<i>Atrial Fibrillation</i>			
% of patients treated with anti-coagulant or anti-platelet drug therapy	8/9 (88.9%)	2905/3112 (93.3%)	0.463
% of patients whose latest record of a CHADS2 score is greater than 1, are currently treated with anticoagulation therapy or anti-platelet therapy	6/15 (40.0%)	5301/8291 (63.9%)	0.063
% of patients with atrial fibrillation in whom stroke risk has been assessed using the CHADS2 risk stratification scoring system in the preceding 12 months (excluding those whose previous CHADS2 score is greater than 1)	23/29 (79.3%)	9738/10227 (95.2%)	0.002
<i>Asthma</i>			
% of patients who have had an asthma review in the previous 12 months	198/257 (77.0%)	36912/56334 (65.5%)	<0.001
% of patients aged 8+ diagnosed as having asthma with measures of variability or reversibility, from 1.4.06 recorded between 3 months before and any time after diagnosis	46/63 (73.0%)	13264/15124 (87.7%)	0.0002
% of patients with asthma aged 14 or over and who have not attained the age of 20, on the register, in whom there is a record of smoking status in the preceding 12 months.	13/13 (100.0%)	3295/3951 (83.4%)	0.144
<i>Cancer</i>			
% of patients with cancer diagnosed within the previous 15 months, who have a patient review recorded within 3 months of confirmation of the diagnosis	5/9 (55.6%)	2739/3434 (79.8%)	0.089
<i>Coronary Heart Disease</i>			
% of patients with a blood pressure of 150/90mmHg or less in the previous 12 months	69/80 (86.3%)	34568/39762 (86.9%)	0.868

% of patients with coronary heart disease whose last measured total cholesterol (measured in the preceding 12 months) is 5 mmol/l or less)	47/80 (58.8%)	27949/39762 (92.4%)	0.027
% of patients with a record of taking aspirin/anti-platelet or anti-coagulant in the previous 12 months (unless contraindicated)	62/80 (77.5%)	36755/39762 (92.4%)	<0.001
% of patients with a history of myocardial infarction currently on an ACE inhibitor or angiotensin receptor blocker, aspirin or an alternative anti-platelet therapy, beta-blocker and statin, if diagnosed after 1.4.11	6/8 (75.0%)	2981/4376 (68.1%)	1.00
% of patients with a record of influenza immunisation in previous 1 September - 31 March	67/80 (83.8%)	32286/39762 (81.2%)	0.668
<i>Chronic Kidney Disease</i>			
% of patients with a record of a urine albumin: creatinine ratio (or protein: creatinine ratio) test in the preceding 12 months.	93/110 (84.5%)	21261/26763 (79.4%)	0.236
% of patients with a blood pressure of 140/85mmHg or less in the previous 12 months	82/110 (74.5%)	19373/26763 (72.4%)	0.670
% of patients with hypertension and proteinuria treated with ACE inhibitor or angiotensin receptor blocker	7/13 (53.8%)	2716/3785 (71.8%)	0.213
<i>Chronic Obstructive Pulmonary Disease (COPD)</i>			
% of patients with a record of influenza immunisation in previous 1 September - 31 March	37/45 (82.2%)	19134/23800 (80.4%)	0.853
% of patients with COPD (diagnosed on or after 1.4.11) in whom the diagnosis has been confirmed by post bronchodilator spirometry between 3 months before and 12 months after entering on to the register	7/14 (50.0%)	4925/5929 (83.1%)	0.005
% of patients with COPD who have had a review, undertaken by a healthcare professional, including an assessment of breathlessness using the Medical Research Council dyspnoea scale in the preceding 12 months	33/45 (73.3%)	18975/23800 (79.7%)	0.270
% of patients with COPD with a record of FEV1 in the preceding 12 months	15/45 (33.3%)	18460/23800 (77.6%)	<0.001
% of patients with COPD and Medical Research Council dyspnoea grade ≥ 3 at any time in the preceding 12 months, with a record of oxygen saturation value within the preceding 12 months	10/12 (83.3%)	8750/9385 (93.2%)	0.193
<i>Contraception Information</i>			

% of women, on the register, prescribed an oral or patch contraceptive method in the preceding 12 months who have also received information from the contractor about long acting reversible methods of contraception in the preceding 12 months	9/127 (7.1%)	47955/51514 (93.1%)	<0.001
Dementia			
% of patients whose care has been reviewed in a face-to-face review in the preceding 12 months	25/34 (73.5%)	4188/5527 (75.8%)	0.693
% of patients with newly diagnosed dementia recorded in the previous 1 April to 31 March with a record of FBC, calcium, glucose, renal and liver function, thyroid function tests, serum vitamin B12 and folate levels, between 6 months before or after entering on to the register	7/12 (58.3%)	787/994 (79.2%)	0.144
Diabetes			
% of patients whose last blood pressure reading in the previous 12 months is 150/90 or less	285/330 (86.4%)	37490/44073 (78.6%)	0.587
% of patients whose last blood pressure reading in the previous 12 months is 140/80 or less	224/330 (67.9%)	29639/44073 (67.2%)	0.860
% of patients with a diagnosis of nephropathy (clinical proteinuria) or micro-albuminuria who are currently treated with an ACE inhibitor or angiotensin receptor blocker	39/56 (69.6%)	6879/8567 (80.3%)	0.062
% of patients whose last IFCC-HbA1c is 59mmol/mol or less in the previous 12 months	174/330 (52.7%)	23805/44073 (54.0%)	0.658
% of patients whose last IFCC-HbA1c is 64mmol/mol or less in the previous 12 months	206/330 (62.4%)	27485/44073 (62.4%)	1.00
% of patients whose last IFCC-HbA1c is 75mmol/mol or less in the previous 12 months	241/330 (73.0%)	32944/44073 (74.7%)	0.484
% of patients with newly diagnosed diabetes in the previous 1 April to 31 March with a record of being referred to a structured education programme within 9 months of entry on to the diabetes register	8/11 (72.7%)	1391/1794 (77.5%)	0.718
% of patients with a record of a foot examination and risk classification: 1) low risk (normal sensation, palpable pulses), 2) increased risk (neuropathy or absent pulses), 3) high risk (neuropathy or absent pulses plus deformity or skin changes in previous ulcer) or 4) ulcerated foot within the preceding 15 months	259/330 (78.5%)	34445/44073 (78.2%)	0.947
% of patients with diabetes, on the register, who have had influenza immunisation in the preceding 1 September to 31 March	263/330 (79.7%)	34624/44073 (94.2%)	0.686
% of patients with diabetes, on the register, whose last measured total cholesterol(measured within the preceding 12 months) is 5 mmol/l or less	239/330 (72.4%)	31119/44073 (70.6%)	0.505

% of patients with diabetes, on the register, who have a record of analbumin:creatinine ratio test in the preceding 12 months	256/330 (77.6%)	35384/44073 (80.3%)	0.212
% of patients with diabetes, on the register, who have a record of retinal screening in the preceding 12 months	260/330 (78.8%)	37143/44073 (84.3%)	0.008
% of patients with diabetes, on the register, who have a record of a dietary review by a suitably competent professional in the preceding 12 months	270/330 (81.8%)	36462/44073 (82.7%)	0.661
% of male patients with diabetes, on the register, with a record of being asked about erectile dysfunction in the preceding 12 months	152/202 (75.2%)	19310/24263 (79.6%)	0.136
% of male patients with diabetes, on the register, who have a record of erectile dysfunction with a record of advice and assessment of contributory factors and treatment options in the preceding 12 months	5/6 (83.3%)	5220/5711 (91.74)	0.417
Epilepsy			
% of patients aged 18 or over on drug treatment for epilepsy who have been seizure free for the last 12 months recorded in the preceding 12 months	407/837 (48.6%)	3488/7160 (48.7%)	0.971
% of women aged 18 or over who have not attained the age of 55 years who are taking antiepileptic drugs who have a record of information and counselling about contraception, conception and pregnancy in the preceding 12 months	83/238 (34.9%)	1094/1654 (66.1%)	<0.001
Heart Failure			
% of patients with a diagnosis of heart failure (diagnosed on or after 1.4.06) which has been confirmed by an echocardiogram or by specialist assessment 3 months before or 12 months after entering on to the register	18/18 (100.0%)	4422/4885 (90.5%)	0.405
% of patients currently treated with ACE inhibitor or angiotensin receptor blocker (of those with a diagnosis of heart failure due to left ventricular systolic dysfunction)	11/16 (68.8%)	2739/3239 (84.6%)	0.088
% of patients who are additionally currently treated with a beta-blocker (of those with a diagnosis of heart failure due to left ventricular systolic dysfunction who are treated with an ACE inhibitor or ARB)	7/11 (63.6%)	1998/2739 (72.9%)	0.502
Hypertension			
% of patients with a blood pressure of 150/90mmHg or less in the previous 9 months	382/480 (79.6%)	95237/122287 (77.9%)	0.408
In those patients with a new diagnosis of hypertension aged 30 or over and who have not attained the age of 75, recorded between the preceding 1 April to 31 March (excluding those with pre-existing CHD, diabetes, stroke and/or TIA), who have a recorded CVD risk assessment score	* (<69.3%)	550/794 (69.3%)	0.521

(using an assessment tool agreed with the NHS CB) of \geq 20% in the preceding 12 months: the percentage who are currently treated with statins			
Hypothyroidism			
% of patients with hypothyroidism, on the register, with thyroid function tests recorded in the preceding 12 months	233/260 (89.6%)	25703/27744 (92.6%)	0.073
Psychosis			
% of patients with schizophrenia, bipolar affective disorder and other psychoses who have a comprehensive care plan documented in the record, (in the preceding 12 months) agreed between individuals, their family and/or carers as appropriate.	219/274 (79.9%)	6324/8878 (71.2%)	0.001
% of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of blood pressure in the preceding 12 months.	244/274 (89.1%)	7025/8878 (79.1%)	<0.001
% of patients aged 40 or over with schizophrenia, bipolar affective disorder and other psychoses who have a record of total cholesterol:HDL ratio in the preceding 12 months.	110/145 (75.9%)	2687/4406 (61.0%)	<0.001
% of patients aged 40 or over with schizophrenia, bipolar affective disorder and other psychoses who have a record of blood glucose or HbA1c in the preceding 12 months.	163/190 (85.8%)	4421/5970 (74.1%)	<0.001
% of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of BMI in the preceding 12 months.	242/274 (88.3%)	6627/8878 (74.63%)	<0.001
% of patients with schizophrenia, bipolar affective disorder and other psychoses who have a record of alcohol consumption in the preceding 12 months.	241/274 (88.0%)	6872/8878 (77.4%)	<0.001
% of women aged 20 or over and who have not attained the age of 61 with schizophrenia, bipolar affective disorder and other psychoses whose notes record that a cervical screening test has been performed in the preceding 5 years.	35/75 (46.7%)	1805/2557 (70.6%)	<0.001
% of patients on lithium therapy with a record of serum creatinine and TSH in the preceding 9 months.	31/32 (96.9%)	1068/1162 (91.9%)	0.508
% of patients on lithium therapy with a record of lithium levels in the therapeutic range in the preceding 4 months.	30/32 (93.8%)	947/1162 (81.5%)	0.101
Osteoporosis			

% of patients aged 50-74 with a fragility fracture on or after 1 April 2012, in whom osteoporosis is confirmed on DXA scan, who are currently treated with an appropriate bone-sparing agent	5/6 (83.3%)	347/431 (80.5%)	1.00
% of patients aged 75+ with a fragility fracture on or after 1 April 2014 and a diagnosis of osteoporosis who are currently treated with an appropriate bone-sparing agent	* (<57.0%)	940/1649 (57.0%)	0.581
Peripheral Arterial Disease			
% of patients with a last blood pressure of 150/90 in the previous 12 months	10/13 (76.9%)	6782/8053 (84.2%)	0.445
% of patients with a record in the previous 12 months of taking aspirin or an alternative anti-platelet drug	10/13 (76.9%)	6583/7336 (89.7%)	0.142
% of patients in whom the last measured total cholesterol (measured in the preceding 12 months) is 5 mmol/l or less	8/13 (61.5%)	5404/8053 (67.1%)	0.769
Rheumatoid Arthritis			
% of patients who have had a face-to-face review in the previous 12 months	10/14 (71.4%)	4078/4711 (86.6%)	0.108
% of patients with rheumatoid arthritis aged 30 or over and who have not attained the age of 85 who have had a cardiovascular risk assessment using a CVD risk assessment tool adjusted for RA in the preceding 12 months	* (<87.0%)	3099/3561 (87.0%)	<0.001
% of patients aged 50 or over and who have not attained the age of 91 with rheumatoid arthritis who have had an assessment of fracture risk using a risk assessment tool adjusted for RA in the preceding 24 months	5/7 (71.4%)	2728/3082 (88.5%)	0.189
Stroke or TIA			
% of patients with a history of stroke or TIA in whom the last blood pressure reading (measured in the preceding 12 months) is 150/90 mmHg or less.	69/83 (83.1%)	16443/19563 (84.1%)	0.765
% of patients with stroke or TIA who have had influenza immunisation in the preceding 1 September to 31 March.	66/83 (79.5%)	15292/19563 (78.2%)	0.894
% of new patients with a stroke or TIA (diagnosed on or after 1 April 2008) who have a record of a referral for further investigation between 3 months before or 1 month after the date of the latest recorded stroke or TIA.	30/51 (58.8%)	8359/9355 (89.4%)	<0.001
% of patients with a stroke shown to be non- haemorrhagic, or a history of TIA, who have a record in the preceding 15 months that an anti-platelet agent, or an anti-coagulant is being taken.	35/42 (83.3%)	11073/12042 (92.0%)	0.078
% of patients with a stroke shown to be non-haemorrhagic, or a history of TIA whose last measured total cholesterol (measured in the preceding 12 months) is 5 mmol/l or less	25/42 (59.5%)	8131/12042 (67.5%)	0.322
% of patients with stroke or TIA who have a record of total cholesterol in the preceding 12 months	60/83 (72.3%)	16233/19563 (83.0%)	0.018

Depression			
% of patients aged 18+ with a new diagnosis of depression in the preceding 1 April to 31 March, who have been reviewed not earlier than 10 days after and not later than 35 days after the date of diagnosis	6/57 (10.5%)	4788/8010 (59.78)	<0.001
% of patients aged 18 or over with a new diagnosis of depression in the preceding 1 April to 31 March, who have had a bio-psychosocial assessment by the point of diagnosis. The completion of the assessment is to be recorded on the same day as the diagnosis is recorded	12/57 (21.1%)	6474/7984 (81.1%)	<0.001
Health Promotion			
% of patients aged 15 or over whose notes record smoking status in the preceding 24 months	3480/3638 (95.7%)	685296/799893 (85.7%)	<0.001
% of patients aged 15 or over who are recorded as current smokers who have a record of an offer of support and treatment within the preceding 24 months	540/736 (73.4%)	168785/193522 (87.2%)	<0.001
% of patients with any or any combination of the following conditions: CHD, PAD, stroke or TIA, hypertension, diabetes, COPD, CKD, asthma, schizophrenia, bipolar affective disorder or other psychoses whose notes record smoking status in the preceding 12 months	1162/1275 (91.1%)	203094/214954 (94.5%)	<0.001
% of women aged 20 or over and who have not attained the age of 60 whose notes record that a cervical screening test has been performed in the preceding 5 years.	273/1193 (22.9%)	177634/195824 (90.7%)	<0.001
% of patients aged 40+ with a record of blood pressure in the previous 5 years	2112/2296 (92.0%)	397475/461298 (86.2%)	<0.001
% of patients diagnosed with hypertension on or after 1 April 2009, who are given lifestyle advice in the previous 12 months for increasing physical activity, smoking cessation, safe alcohol consumption and healthy diet	94/145 (64.8%)	18349/21587 (85.0%)	<0.001
% of patients with any or any combination of the following conditions: CHD, PAD, stroke or TIA, hypertension, diabetes, COPD, CKD, asthma, schizophrenia, bipolar affective disorder or other psychoses who are recorded as current smokers who have record of an offer of support and treatment within the preceding 12 months	222/349 (63.6%)	48669/52880 (92.0%)	<0.001

***Possibly disclosive cells (e.g., where the value is small) have been suppressed, with an indication given as to whether the % is greater or less than for the general population.**

Table 2: Achievement on Quality and Outcome Framework indicators over time for the intellectual disabilities groups at 2007-2010 and 2014 [on 2007 indicators where comparable information is available in 2014]

Individual Indicators	Intellectual disabilities (2007-2010)	Intellectual disabilities (2014)	P value
<i>Atrial Fibrillation</i>			
% of patients treated with anti-coagulant or anti-platelet drug therapy	5/7 (71.4%)	29/32 (90.6%)	0.213
<i>Asthma</i>			
% of patients who have had an asthma review in the previous 15 months	21/66 (31.8%)	198/257 (77.0%)	<0.001
% of patients aged 8+ diagnosed as having asthma with measures of variability or reversibility, from 1.4.07	3/18 (16.7%)	46/63 (73.0%)	<0.001
<i>Coronary Heart Disease</i>			
% of patients with a blood pressure of 150/90mmHg or less in the previous 15 months	18/25 (72.0%)	69/80 (86.3%)	0.128
% of patients with a total cholesterol of 5mmol/l or less in the previous 15 months	11/25 (44.0%)	47/80 (58.8%)	0.251
% of patients with a record of taking aspirin/anti-platelet or anti-coagulant in the previous 15 months (unless contraindicated)	18/25 (72.0%)	62/80 (77.5%)	0.596
% of patients with a history of MI treated with ACE inhibitor or angiotensin II antagonist, if diagnosed after 1.4.03	1/6 (16.7%)	6/8 (75.0%)	0.103
% of patients with a record of influenza immunisation in preceding 1 September – 31 March	15/24 (62.5%)	67/80 (83.3%)	0.043
<i>Chronic Kidney Disease</i>			

% of patients with a blood pressure of 140/85mmHg or less in the previous 15 months	11/15 (73.3%)	82/110 (74.5%)	1.000
% of patients treated with ACE inhibitor or angiotensin receptor blocker ¹	6/15 (40.0%)	7/13 (53.8%)	0.705
<i>Chronic Obstructive Pulmonary Disease (COPD)</i>			
% of patients who have had influenza immunisation in preceding 1 September – 31 March	8/9 (88.9%)	37/45 (82.2%)	1.000
% of all patients with diagnosis confirmed by spirometry including reversibility testing ²	4/9 (44.4%)	7/14 (50.0%)	1.000
% of patients with a record of FeV1 in the previous 15 months	4/9 (44.4%)	15/45 (33.3%)	0.704
<i>Diabetes</i>			
% of patients with a record of presence or absence of peripheral pulses in the previous 15 months	27/46 (58.7%)	259/330 (78.5%)	0.005
% of patients with a record of neuropathy testing in the previous 15 months	13/46 (28.3%)	259/330 (78.5%)	<0.001
% of patients with a record of neuropathy testing and with a record of presence or absence of peripheral pulses in the previous 15 months	13/46 (28.3%)	259/330 (78.5%)	<0.001
% of patients with diabetes whose last blood pressure is 145/85 or less ³	35/46 (76.1%)	285/330 (86.4%)	0.077
% of patients with diabetes whose last blood pressure is 145/85 or less ⁴	35/46 (76.1%)	224/330 (67.9%)	0.310
% of patients with record of retinal screening in the previous 15 months	32/46 (69.6%)	260/330 (78.8%)	0.185

% of patients whose last total cholesterol is 5mmol/l or less	22/46 (47.8%)	239/330 (72.4%)	0.001
% of patients who had influenza immunisation in the preceding 1 September - 31 march	29/46 (63.0%)	263/330 (79.7%)	0.014
% of patients in whom last HbA1c test is 7.5 or less	20/46 (43.5%)	241/330 (73.0%)	<0.001
<i>Epilepsy</i>			
% of patients on drug treatment for epilepsy who are seizure free for 12 months in the previous 15 months	62/203 (30.5%)	407/83.7 (48.6%)	<0.001
<i>Heart Failure</i>			
% of patients confirmed by echocardiogram or specialist, for diagnoses after 1.4.06	4/7 (57.1%)	18/18 (100.0%)	0.015
% of patients with heart failure due to left ventricular dysfunction treated with ACE inhibitor or angiotensin receptor blocker (unless contraindicated)	5/18 (27.8%)	11/16 (68.8%)	0.037
<i>Hypertension</i>			
% of patients with a blood pressure of 150/90 or less in the previous 9 months	64/92 (69.6%)	382/480 (79.6%)	0.039
<i>Hypothyroidism</i>			
% of patients with a record of thyroid function tests in the previous 15 months	30/38 (78.9%)	233/260 (89.6%)	0.100
<i>Psychosis</i>			
% of patients on lithium therapy with a record of serum creatinine and TSH in the previous 15 months	4/11 (36.4%)	31/32 (96.9%)	<0.001
% of patients on lithium therapy with a record of lithium levels in a therapeutic range in the previous 6 months	4/11 (36.4%)	30/32 (93.8%)	<0.001

% of patients with a record of comprehensive care plan agreed with individual, family or carer	18/40 (45.0%)	219/274 (79.9%)	<0.001
Stroke			
% of patients with a blood pressure reading of 150/90 or less in the previous 15 months	10/13 (76.9%)	69/83 (83.1%)	0.696
% of patients with a record of total cholesterol in the previous 15 months	6/13 (46.2%)	60/83 (72.3%)	0.103
% of patients with a total cholesterol of 5mmol/l or less in the previous 15 months	4/13 (30.8%)	25/42 (59.5%)	0.112
% of patients with a record of influenza immunisation in the preceding 1 September - 31 March	6/13 (46.2%)	66/83 (79.5%)	0.016
% of new patients with a stroke with a record of referral for further investigation	1/4 (25.0%)	30/51 (58.8%)	0.307
% of patients with non-haemorrhagic stroke or history of transient ischaemic attacks with record of taking anti-platelet or anti-coagulant (unless contraindicated)	7/13 (53.8%)	35/42 (83.3%)	0.057
Health Promotion			
% of patients with any of the following: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD or asthma, who have a record of smoking status in the previous 15 months, except never-smokers who need the recording once since diagnosis	162/190 (85.3%)	1162/1275 (91.1%)	0.017
% of patients with record of smoker status with any of: coronary heart disease, stroke or TIA, hypertension, diabetes, COPD or asthma, who are offered smoking cessation advice or specialist referral	18/53 (34.0%)	222/349 (63.6%)	<0.001
% of patients aged 21-60) whose notes record a cervical smear has been performed in the last five years (Standard 40 - 80%)	51/221 (23.1%)	273/1193 (22.9%)	0.931
% of patients aged 45 or over whom have a record of blood pressure in the preceding 5 years. ⁵	319/356 (89.6%)	2112/2296 (92.0%)	0.148

- ¹ – In 2014 this was restricted to chronic kidney disease patients with hypertension and proteinuria.
- ² – In 2014 this was additionally restricted to between 3 months before and 12 months after entering on to the register.
- ³ – In 2014 the blood pressure was 150/90.
- ⁴ – In 2014 the blood pressure was 140/80.
- ⁵ – In 2014 the criteria was patients aged 40 or over.

Table 3: Changes in health-care and the health-care inequalities gap over time: proportion of long-term conditions and health promotion indicators met for the intellectual disabilities group compared with the general population group in 2007-2010 and 2014

Achievement (%)	Proportion of good practice indicators met 2007-2010 (n=56) N (%)		Proportion of good practice indicators met 2014 (n=78) N (%)	
	Intellectual disabilities	General population	Intellectual disabilities	General population
0-25%	5 (8.9)	0 (0)	4 (5.1)	0 (0)
26-50%	21 (37.5)	1 (1.8)	6 (7.7)	1 (1.3)
51-75%	19 (33.9)	12 (21.4)	29 (37.2)	22 (28.2)
76-100%	11 (19.6)	43 (76.8)	39 (50.0)	55 (70.5)

Table 4. Differences in health-care and the health-care inequality gap between groups and over time: results from ordinal regression analyses on group effects over time, and time effects within group for the proportion of long term condition and health promotion indicators met

Regression		Odds ratio	95% confidence intervals
1. Effects within group			
<i>Intellectual disabilities group</i>			
Time point effect	2007-2010	Reference	-
	2014	5.32	2.69, 10.55
<i>General population group</i>			
Time point effect	2007-2010	Reference	-
	2014	0.74	0.34, 1.64
2. Effects within time points			
<i>2007-2010</i>			
Group effect	General population group	Reference	-
	Intellectual disabilities group	0.05	0.02, 0.12
<i>2014</i>			
Group effect	General population group	Reference	-
	Intellectual disabilities group	0.38	0.20, 0.73